

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

INTERNATIONAL APPLICATION NO.  
PCT/DE00/00751INTERNATIONAL FILING DATE  
13 March 2000PRIORITY DATE CLAIMED  
12 March 1999

## TITLE OF INVENTION

METHOD FOR ADAPTING THE MODE OF OPERATION OF A MULTI-MODE CODE TO THE CHANGING  
CONDITIONS OF RADIO TRANSFER IN A CDMA MOBILE RADIO NETWORK

APPLICANT(S) FOR DO/EO/US

Rene Bemmer et al.

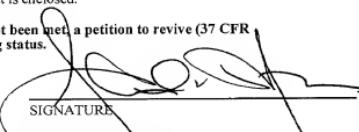
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1.  This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2.  This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3.  This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4.  A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5.  A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a.  is transmitted herewith (required only if not transmitted by the International Bureau).
  - b.  has been transmitted by the International Bureau.
  - c.  is not required, as the application was filed in the United States Receiving Office (RO/US).
6.  A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7.  A copy of the International Search Report (PCT/ISA/210).
8.  Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a.  are transmitted herewith (required only if not transmitted by the International Bureau).
  - b.  have been transmitted by the International Bureau.
  - c.  have not been made; however, the time limit for making such amendments has NOT expired.
  - d.  have not been made and will not be made.
9.  A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10.  An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11.  A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12.  A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

## Items 13 to 20 below concern document(s) or information included:

13.  An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14.  An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15.  A **FIRST** preliminary amendment.
16.  A **SECOND** or **SUBSEQUENT** preliminary amendment.
17.  A substitute specification.
18.  A change of power of attorney and/or address letter.
19.  Certificate of Mailing by Express Mail
20.  Other items or information:

Check No. 100686

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.137(a)) <b>09/936273</b>	INTERNATIONAL APPLICATION NO. <b>PCT/DE00/00751</b>	ATTORNEY'S DOCKET NUMBER <b>RBL0081</b>										
<b>21.</b> The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :</b> <table border="1"> <tr> <td><input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO .....</td> <td>\$1,000.00</td> </tr> <tr> <td><input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .....</td> <td>\$860.00</td> </tr> <tr> <td><input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....</td> <td>\$710.00</td> </tr> <tr> <td><input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)(4).....</td> <td>\$690.00</td> </tr> <tr> <td><input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)(4).....</td> <td>\$100.00</td> </tr> </table>			<input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO .....	\$1,000.00	<input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .....	\$860.00	<input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....	\$710.00	<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)(4).....	\$690.00	<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)(4).....	\$100.00
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<b>CALCULATIONS PTO USE ONLY</b>												
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b> <b>\$860.00</b>												
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (c)). <input type="checkbox"/> 20 <input type="checkbox"/> 30 <b>\$0.00</b>												
CLAIMS	NUMBER FILED	NUMBER EXTRA										
Total claims	20 - 20 =	0										
Independent claims	1 - 3 =	0										
Multiple Dependent Claims (check if applicable).		<input type="checkbox"/>										
<b>TOTAL OF ABOVE CALCULATIONS =</b> <b>\$860.00</b>												
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). <input type="checkbox"/> <b>\$0.00</b>												
<b>SUBTOTAL =</b> <b>\$860.00</b>												
Processing fee of <b>\$130.00</b> for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)). <input type="checkbox"/> 20 <input type="checkbox"/> 30 <b>+</b> <b>\$0.00</b>												
<b>TOTAL NATIONAL FEE =</b> <b>\$860.00</b>												
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/> <b>\$0.00</b>												
<b>TOTAL FEES ENCLOSED =</b> <b>\$860.00</b>												
<input type="checkbox"/> <b>Amount to be refunded</b> <b>\$</b> <input type="checkbox"/> <b>charged</b> <b>\$</b>												
<input checked="" type="checkbox"/> A check in the amount of <b>\$860.00</b> to cover the above fees is enclosed. <input type="checkbox"/> Please charge my Deposit Account No. <b>02-0385</b> in the amount of <b>\$</b> to cover the above fees. A duplicate copy of this sheet is enclosed. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. <b>02-0385</b> A duplicate copy of this sheet is enclosed.												
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b>												
SEND ALL CORRESPONDENCE TO: <div style="border: 1px solid black; padding: 5px;"> John F. Hoffman  BAKER &amp; DANIELS  111 East Wayne Street, Suite 800  Fort Wayne, IN 46802 </div>												
<div style="text-align: right; margin-right: 100px;">   <b>SIGNATURE</b>  <b>JOHN F. HOFFMAN</b>  <b>NAME</b>  <b>26,280</b>  <b>REGISTRATION NUMBER</b>  <b>SEPTEMBER 10, 2001</b>  <b>DATE</b> </div>												

(12) INTERNATIONAL APPLICATION PUBLISHED ACCORDING TO THE  
TREATY REGARDING INTERNATIONAL COOPERATION IN PATENT  
MATTERS (PCT)

(19) World Intellectual Property Organization, International Office

(43) Date of international publication Sept. 21, 2000

(10) Number of international publication WO 00/56001 A1

(31) International patent classification H04L 1/00

(21) International file ID PCT /DE00/00751

(22) Date of international application March 13, 2000

(25) Language of application German

(26) Language of publication German

(30) Priority data 199 11 179 0 March 12, 1999 DE

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[(54) Title and (57) Abstract are in English, not reproduced here]

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Certification

I, Klaus Alt, certify hereby that the attached 26 pages are a complete and true translation of the patent documentation and associated materials under International Publication Number PCT WO 00/50001 AI to the best of my knowledge and belief. I am an experienced translator accredited by the American Translators Association for translation from German to English and from English to German. My ATA membership number is 5684.

Klaus Alt

8-31-2001

Date

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## APPLICATION INFORMATION

Title Line One:: METHOD FOR ADAPTING THE MODE OF OPERATIO  
Title Line Two:: N OF A MULTI-MODE CODE TO THE CHANGING C  
Title Line Three:: ONDITIONS OF RADIO TRANSFER IN A CDMA MO  
Title Line Four:: BILE RADIO NETWORK  
Total Drawing Sheets:: 3  
Formal Drawings?:: Yes  
Application Type:: Utility  
Docket Number:: RBL0081  
Secrecy Order in Parent Appl.?:: No

## REPRESENTATIVE INFORMATION

Representative Customer Number:: 832  
Registration Number One:: 26280  
Registration Number Two:: 24871  
Registration Number Three:: 40181  
Registration Number Four:: 32816  
Registration Number Five:: 44326  
Registration Number Six:: 46644  
Registration Number Seven:: 48230

Registration Number Eight:: 48238  
Registration Number Nine:: 48358  
Registration Number Ten:: 48696  
Registration Number Eleven:: 33687  
Registration Number Twelve:: 18778  
Registration Number Thirteen:: 32230  
Registration Number Fourteen:: 39679  
Registration Number Fifteen:: 32722  
Registration Number Sixteen:: 37370  
Registration Number Seventeen:: 41358  
Registration Number Eighteen:: 45547  
Registration Number Nineteen:: 44403  
Registration Number Twenty:: 46791  
Registration Number Twenty-One:: 47116  
Registration Number Twenty-Two:: 47679

PRIOR FOREIGN APPLICATIONS

Foreign Application One:: 199 11 179.0  
Filing Date:: 03-12-1999  
Country:: Germany  
Priority Claimed:: Yes  
Foreign Application Two:: PCT/DE00/00751  
Filing Date:: 03-13-2000  
Country:: WO  
Priority Claimed:: Yes  
Source:: PrintEFS Version 1.0.1

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of )  
René Bemmer et al. )  
Serial No. ) Group:  
Filed: )  
Title: METHOD FOR ADAPTING THE MODE ) Examiner:  
OF OPERATION OF A MULTI-MODE )  
CODE TO THE CHANGING )  
CONDITIONS OF RADIO TRANSFER )  
IN A CDMA MOBILE RADIO NETWORK )

**PRELIMINARY AMENDMENT DELETING MULTIPLE DEPENDENT CLAIMS**

Assistant Commissioner of Patents  
Washington, DC 20231

Sir:

Prior to calculating the filing fee, please enter the following amendments to the application.

**IN THE CLAIMS**

In claim 4, line 1, delete "one of Claims 1 to 3" and substitute therefor --claim 1--.  
In claim 5, line 1, delete "one of Claims 1 to 4" and substitute therefor --claim 1--.  
In claim 6, line 1, delete "one of Claims 1 to 5" and substitute therefor --claim 1--.  
In claim 7, line 1, delete "one of Claims 1 to 6" and substitute therefor --claim 1--.  
In claim 8, line 1, delete "one of Claims 1 to 7" and substitute therefor --claim 1--.  
In claim 9, line 1, delete "one of Claims 1 to 8" and substitute therefor --claim 1--.  
In claim 10, line 1, delete "one of Claims 1 to 9" and substitute therefor  
--claim 1--.  
In claim 11, line 1, delete "one of Claims 1 to 10" and substitute therefor  
--claim 1--.  
In claim 12, line 1, delete "one of Claim 1 to 11" and substitute therefor  
--claim 1--.  
In claim 13, line 1, delete "one of Claims 11 or 12" and substitute therefor  
--claim 11--.  
In claim 14, line 1, delete "one of Claims 1 to 13" and substitute therefor  
--claim 1--.

Please add the following new claims:

--15. Procedure according to claim 2, characterized by having the decision to change the codec operating mode originate in the radio network controllers RNC (3) of the mobile transmission network.

16. Procedure according to claim 3, characterized by having the decision to change the codec operating mode originate in the radio network controllers RNC (3) of the mobile transmission network.

17. Procedure according to claim 2, characterized by having the radio network controllers RNC (3) select the physical transmission channel to be used when there is a change of the codec operating mode.

18. Procedure according to claim 3, characterized by having the radio network controllers RNC (3) select the physical transmission channel to be used when there is a change of the codec operating mode.

19. Procedure according to claim 4, characterized by having the radio network controllers RNC (3) select the physical transmission channel to be used when there is a change of the codec operating mode.

20. Procedure according to claim 2, characterized by having the base stations Node-Bs (4) inform the radio network controller RNC (3) regarding the quality of the connection in the uplink, and where the mobile stations MS (6), using Node-Bs (4) of the radio network controller RNC (3), decides on a change of codec operating modes based on the measurement values.--

Respectfully submitted,

John F. Hoffman  
Registration No. 26,280  
Attorney for Applicant

JFH/pmp

BAKER & DANIELS  
111 East Wayne Street, Suite 800  
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Date: September 10, 2001

the first time in the history of the world, the *whole* of the human race, in all its parts, has been gathered together, and is now to be seen in one place.

Method for Adapting the Mode of Operation of a Multi-Mode Codecs to the Changing Conditions of Radio Transmission in a CDMA Mobile Radio Network.

(0001) The invention concerns a method for adapting the mode of operation of a multi-mode codec to the changing conditions of radio transmission in a CDMA mobile radio network.

(0002) Mobile radio networks code voice signals differently than public switching telephone networks. Voice coding, such as that in use between the mobile station (MS) and the Radio Access Network (RAN), takes into account – in distinction from voice coding in public switching telephone networks – particularly the propagation properties of the radio link. For conversations between mobile stations in the same mobile network, a conversion to different voice coding (transcoding) is not absolutely required, whereas this is required for conversations between users of a mobile station and a telephone in a public switching telephone network. Conversations between mobile stations without conversion to different voice coding are termed transcoder-free.

(0003) The propagation conditions of a radio transmission segment vary continuously. This derives from modifications of the propagation conditions on the one hand and from interference on the other hand. Both the propagation conditions and interference can vary quickly in the course of an existing transmission. Users within the same network or in other radio systems are responsible for interference. Depending on the propagation conditions at hand, modifications to the source code may be required.

(0004) The following methods may be used in a CDMA system to maintain as much as possible of the quality of the connection under varying conditions in the radio transmission segment:

- Adaption of the gross bit rate
- Adaption of the transmission power
- Adaption of the codec operation method: i.e. change to a more robust codec operation method in worsening transmission conditions.

(0005) A more robust codec operation method is understood as a reduced net bit rate (bit rate of voice coding) and thus increased channel coding. Codec is understood to be a function where voice signals are coded for transmission by the transmitter and the received voice signals are decoded by the receiver.

(0006) The described methods are used in combination.

(0007) Previously, the adaption was done separately for each transmission interface. For a transmission from a mobile station to a mobile station, the coding of the voice signal was adjusted by each transmission interface independently of each other. The voice signal was always transcoded for transfer into the fixed wire network. This double conversion provides for independence of the adaption in the transmission interfaces involved.

(0008) It is the intent of the present invention to specify a method for the adaption of the mode of operation of a multi-mode codec to changing transmission conditions in a CDMA mobile transmission network, which automatically adapts the codec operation method during a communication connection and thus allows for the most efficient transmission of voice signals in the mobile transmission network and between the mobile transmission network and the public switching telephone network.

(0009) This task is solved by the characteristics of the independent patent claim.

(0010) The invention is based on the coordination between both transmission interfaces involved in a connection. The core of the invention is the specification of a method, which describes how this coordination may be handled during a live communication connection and how the present or future adjustment is transmitted between the two units involved.

(0011) This achieves an automatic optimization of the codec mode to the current transmission conditions in the radio transmission segment between mobile stations and base stations in an efficient way. This will raise the interference resistance and transmission quality in the mobile network markedly and will contribute to optimal use of network resources, such as economy of frequency use, needed transmission power etc.

(0012) Advantageous further developments and embodiments of the invention are listed in the subservient patent claims.

(0013) The invention will be described more fully in the following by a sample embodiment with reference to several drawings. Additional characteristics and advantages of the invention can be derived from the drawings and their descriptions.

(0014) The drawings are:

(0015) Fig. 1: An example for a mobile transmission network with connections between two mobile stations without a transcoder and a connection between a mobile station and the public switching telephone network with a transcoder;

(0016) Fig. 2: A representation of the transmission of voice information on all segments between mobile stations and between a mobile station and the public switching telephone network;

(0017) Fig. 3: An example for a transmission framework with fields for inband-signaling;

(0018) Fig. 4: A representation of the transmission of voice information between mobile stations in the initial situation;

(0019) Fig. 5: A representation of signaling to change the codec operation mode; and

(0020) Fig. 6: A representation after modification of the codec operation mode in a segment, i.e. asymmetrical sending and receiving.

(0021) The initial assumption is for network architecture as shown in Fig. 1. The CDMA mobile communications network shown in Fig. 1 consists of two segments, namely Radio Access Network (RAN) 1 and the Core Network (CN) 2. RAN 1 includes the node types Radio Network Controller (RNC) 3, also designated as control of the base station, and Node-B 4, also labeled base station. In instances of soft handover, two or more Node-B 4 units are involved in the transmission connection. CN 2 includes the node type U-MSC 5, also labeled U-Mobile Services Switching Center. There is a radio transmission segment or air interface between a mobile station (MS) 6 and RAN 1. CN 2 is connected to the public switching telephone network 8 (ISDN, PSTN). The described embodiment is based on the following assumptions:

- (0022) A Multi-Mode Codec (MMC) is implemented in all mobile stations 6, i.e. voice coding in various forms with varying coding parameters are possible. Each codec operating form has a specified parameter set in multi-mode codecs. The various potential operating modes of a MMC serve for the adaption of voice coding to the conditions in the radio transmission segment.

• (0023) A transcoder 7 is in position in CN 1; it serves to convert the respective voice coding between mobile network 1, 2 and the public switching telephone network 8.

• (0024) The connection 10 between mobile stations does not include a transcoder, i.e. it operates without a voice code conversion in the connection between the two mobile stations 6a, 6b. This requires that the two mobile stations 6a, 6b will always use the same codec operating mode for a connection in a duplex direction.

(0025) The method of adaption of codec operating mode according to the invention for the mobile transmission network shown in Fig. 1 is described below; it is based on the following assumptions:

- (0026) Inband signaling is used in a connection between RNC 3a, 3b or between RNC 3 and transcoder 7, i.e. load and signal information are transmitted on the same channel.
- (0027) Differing codec operating modes may be used simultaneously in both duplex directions, i.e. the codec operating mode for MS 6a to MS 6b (the first MS transmits, the second MS receives) may differ from the codec operating mode for MS 6b to MS 6a (the second MS transmits, the first MS receives).
- (0028) Outband signaling is used within RAN 1 to modify the codec operating mode.
- (0029) RNC 3 decides whether to change codec operating modes.
- (0030) RNC 3 decides on the physical transmission channel, when the codec operating mode is changed, i.e. RNC 3 determines the parameters of channel coding, the gross bit rate, and the transmission power for the new codec operating mode.

(0031) The following discussion assumes that the number of available codec operating modes is N and that the operating mode n+1 is more robust than operating mode n. L represents the maximum number of levels which may be skipped, if the transmission conditions have improved.

(0032) The voice data for a certain time period are transmitted in the mobile radio network in the sequential frame 12. According to Fig. 3, each frame 12 corresponds to the source-coded voice signal 13 and a prefix. The time period is described as the frame length and may amount to 20 ms, for example. The prefix

consists of two fields 14, 15. The first field 14 is identified as Codec Mode Identification (CMI). CMI specifies which codec operating mode is used for this voice frame 13.

(0033) The receiver undertakes a voice decoding according to the operating mode specified in CMI.

(0034) The second field 15 is designated as the Better Radio Condition Indication (BRI). BRI is used, when the transmission conditions have improved on the entire transmission route, i.e. on two radio transmission segments in the case of a MS to MS connection 10 and on a single radio transmission segment in the case of a connection between a MS and the public switching telephone network, and thus when a switch may be made to a less robust codec operating mode. If, for example, BRI has the value 0, the transmission conditions have not improved. If the value for BRI is changed to  $BRI > 1$ , then there has been an improvement in transmission conditions. The higher the value for BRI, the larger the improvement in transmission conditions.

(0035) Fig. 2 indicates how the voice information is transmitted on the various segments. It is assumed here for simplification that the connection involves only one Node-B 4 in each case.

(0036) The following rules apply to a change of the operating mode:

- A change to a more robust operating mode is carried out whenever the transmission conditions deteriorate on one of the two transmission segments.
- (0037) A change to a less robust operating mode is carried out whenever the transmission conditions improve on both transmission segments.

(0038) The following initial conditions prevail prior to a change to a different operating mode:

(0039) According to Fig. 4, there is a communication connection between a first MS 6a and a second MS 6b. Mobile stations 6a and 6b send and receive in the same codec operating mode, identified by the frame prefix 14a (CM1a). For the sake of simplicity, it is assumed here as well that only one Node-B is involved in the transmission for each mobile station.

(0040) Each of RNC 3a, 3b involved in the communication receives constantly measurement reports from its associated Node-B 6a or 6b involved in the communication. For example, if RNC 3a connected to MS 6a notes that the transmission conditions in the air interface between Node-B 4a and MS 6a are deteriorating, then a change in codec operating modes is necessary.

(0041) RNC 3a instructs MS 6a via the signaling channel (outband signaling) to use a different operating mode, such as n+1, and also specifies the time of switch-over. This is done via the signaling channel. The time is specified by means of the frame identification. This identification is exchanged between RNC 3a and MS 6a to assure mutual synchronization.

(0042) Because MS 6a needs to synchronize with each of Node-B 4a, 4a.1, 4a.2 involved in the connection, each transmission interface between MS 6a and the respective Node-B 4a, 4a.1, 4a.2 uses different frame identification for frame 12, which contains the same information, as shown in Fig. 5. MS 6a transmits in the new operating mode n+1, noted by the prefix 14b (CM1b), from the specified point in time.

(0043) RNC 3a receives voice signals in the modified operating mode n+1 from MS 6a and relays these to RNC 3b. In addition, the new CM1 14b, now corresponding to CM1b, is transmitted or signaled in the load channel, i.e. inband. RNC 3a receives voice signals in unchanged operating mode n, corresponding to CM1a 14a from RNC 3b, as shown in Fig. 6.

(0044) RNC 3b receives voice frame 13 in the new operating mode n+1 and determines CM1, in this case CM1b. RNC 3b determines, on the basis of the transmission conditions in its area, the physical channel (transmission channel), the channel coding, the gross bit rate, and the transmission power for the new codec operating mode n+1 and communicates this to all involved Node-B 4b. At the same time, RNC 3b copies the voice frame 12 and transmits it to all involved Node-B 4b.

(0045) MS 6b receives the voice frame 12 in modified operating mode n+1 and carries out the voice decoding according to CM1b. Node-B 4b (or all Node-Bs) communicates the channel coding to MS 6b for each physical control channel, where MS 6b decodes the channel correspondingly.

(0046) MS 6b immediately begins to transmit in the new operating mode as specified by CM1b.

(0047) This achieves the target situation, in which MS 6a and MS 6b transmit and receive in the new operating mode n+1.

(0048) As long as transmission conditions do not improve in RNC 3a or 3b, all voice frames are set to the value BRI=0. The current codec operating mode stays in effect.

(0049) As soon as RNC 3a or 3b note that the transmission conditions have improved and that a change from the current codec operating mode n to n-1 would be

possible as far as it is concerned, it communicates this to the associated MS 6a or 6b. MS 6a or 6b then sends a value of BRI>0, such as BRI=1, in its voice frame. However, both transmission segments continue to use the current codec operating mode n.

(0050) When RNC 3a or 3b receives a voice frame with BRI=I1>0 and sends a voice frame BRI=I2>0, it initiates a change of the codec operating mode from n to n-I, where I is the lesser value of I1 and I2. Thus, the preferred choice will always be the codec operating mode corresponding to the transmission conditions on the worst segment.

(0051) The method of the subsequent modification of the codec operating mode is identical to the algorithm described above.

(0052) The adaption of the codec operating mode for a connection between a MS and the public switching telephone network represents a special case of the specified procedure. It involves a change of codec operating mode in RNC 3 on the one hand and in transcoder 7 on the other hand.

(0053) In this case, BRI will always have the maximum value L for the voice frame sent by the transcoder, i.e. for the connection in the downlink or the direction terminating in the MS. This means that the codec operating mode used for the connection to the public switching telephone network (via the transcoder) is irrelevant. The codec operating mode is determined solely by the transmission segment to/from the mobile station.

Legend of Figures and List of Abbreviations

1	RAC
2	CN
3, 3a, 3b	RNC
4, 4a, 4b	Node-B
5, 5a, 5b	U-MSC
6, 6a, 6b	MS
7	Transcoder
8	Public Switching Telephone Network
9	User of Public Switching Telephone Network
10	Connection MS to MS
11	Connection MS to Public Switching Telephone Network
12, 12a, 12b	Transmission Frame
13	Voice Frame
14, 14a, 14b	Prefix CMI
15	Prefix BRI

[remainder of page shows German-English glossary, not reproduced here, except for:]

TE1        Use unit

1. Procedure to adapt the operating mode of a multi-mode codec to changing transmission conditions in a CDMA mobile transmission network, characterized by having an automatic initiation of a change of codec operating mode whenever the quality of transmission for a unit involved in a transmission is modified, where information about the present or future change in codec operating mode is exchanged among the other participants in the communication process.
2. Procedure according to Claim 1, characterized by having a change to a more robust codec operating mode whenever the transmission conditions on any transmission segment involved in the process deteriorate.
3. Procedure according to Claim 1, characterized by having a change to a less robust codec operating mode whenever the transmission conditions on all transmission segments involved in the process improve.
4. Procedure according to one of Claims 1 to 3, characterized by having the decision to change the codec operating mode originate in the radio network controller RNC (3) of the mobile transmission network.
5. Procedure according to one of Claims 1 to 4, characterized by having the radio network controller RNC (3) select the physical transmission channel to be used when there is a change of the codec operating mode.
6. Procedure according to one of Claims 1 to 5, characterized by having the radio network controller RNC (3) continuously receive and evaluate measurement reports regarding the quality of the connection on the transmission segments from all associated base stations Node-Bs (4) in order to use the measurement values in the decision to change codec operating modes.
7. Procedure according to one of Claims 1 to 6, characterized by having outband signaling within the radio network controller RAN [sic] (3) regarding a change in codec operating mode.
8. Procedure according to one of Claims 1 to 7, characterized by having inband signaling among the radio network controllers RNC (3) involved or between the radio network controller RNC (3) and a transcoder (7) to exchange information on the codec operating mode being used.
9. Procedure according to one of Claims 1 to 8, characterized by having the inband signaling use specific fields of the transmission frame (12), where a first field

CMI (14) specifies which codec operating mode is used for this transmission frame (12) and where a second field BRI (15) identifies a change in the transmission conditions along the entire transmission path.

10. Procedure according to one of Claims 1 to 9, characterized by allowing differing codec operating modes to be in place simultaneously in a connection with two duplex directions.

11. Procedure according to one of Claims 1 to 10, characterized by having the radio network controller RNC (3) instruct the mobile station MS (6) via the signaling channel to use a different codec operating mode and to specify the time of change.

12. Procedure according to one of Claims 1 to 11, characterized by specifying the time of change by means of the frame identification.

13. Procedure according to one of Claims 1 to 12, characterized by having the mobile station MS (6) transmit in the new operating mode from the specified point in time.

14. Procedure according to one of Claims 1 to 13, characterized by having the radio network controller RNC (3) receive transmission frames (12) with voice signals in the new codec operating mode from the mobile station MS (6), which the radio network controller RNC (3) transmits to other radio network controllers RNC (3) involved in the transmission.

[pages 1/3, 2/3 and 3/3 of charts involve no text, except:]

codierte Sprache	= coded voice
Quellencodierte Sprachrahmen	= source-coded voice frame

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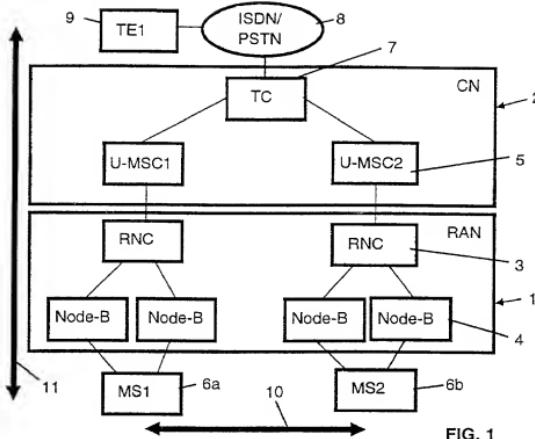


FIG. 1

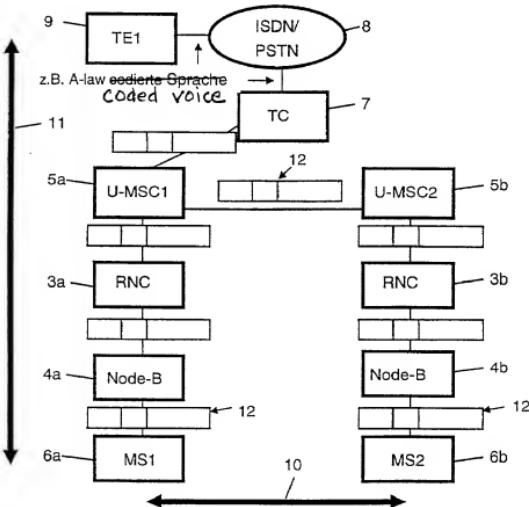


FIG. 2

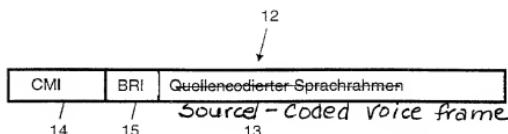


FIG. 3

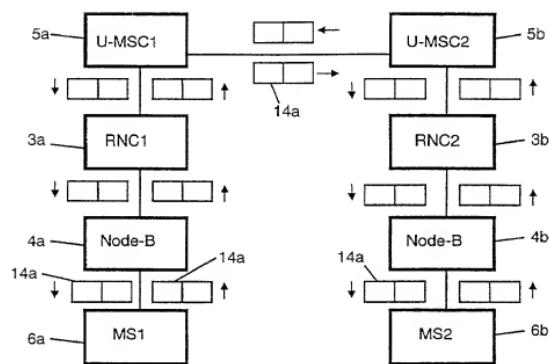
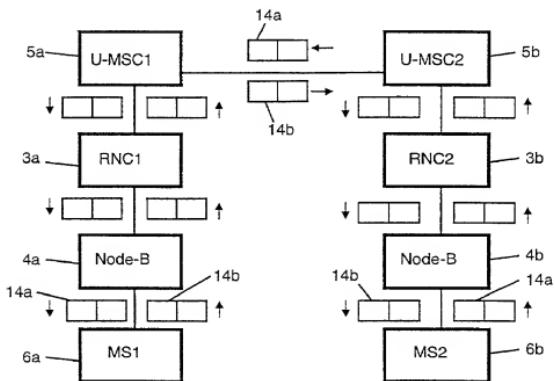
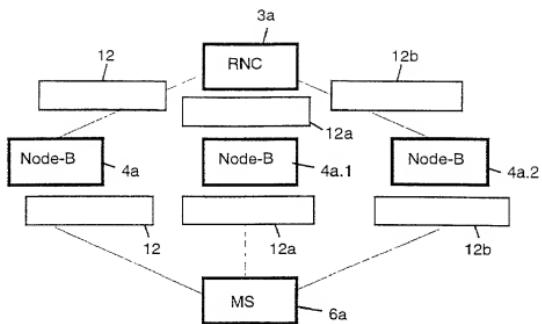


FIG. 4



# Declaration and Power of Attorney for Patent Application

## Erklärung für Patentanmeldungen mit Vollmacht

### German Language Declaration

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Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen Patentanmeldung, einschließlich der Ansprüche, die eventuell durch einen oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und verstanden habe.

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD FOR ADAPTING THE MODE OF OPERATION OF A MULTI-MODE CODE TO THE CHANGING CONDITIONS OF RADIO TRANSFER IN A CDMA MOBILE RADIO NETWORK

the specification of which is attached hereto unless the following box is checked:

was filed on March 13, 2000 as United States Application Number or PCT International Application Number PCT/DE00/00751 and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

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Priority Not Claimed  
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12 March 1999 (Day/Month/Year Filed) (Tag/Monat/Jahr der Anmeldung)
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DE00/00751 (Application No.) (Aktenzeichen)	13 March 2000 (Filing Date) (Anmeldetag)
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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)

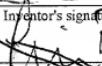
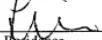
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Michael D. Smith, Regis. No. 40,191; Michael S. Gzybowski, Regis. No. 32,816; Michael D. Schwartz, Regis No. 44,326; Adam F. Cox, Regis No. 46,644; Abigail M. Butler, Regis. No. P-48,238; Thomas A. Adams, Regis. No. P-48,230; and Kimberly J. Paulus, Regis. No. 48,358; all of BAKER & DANIELS, 111 East Wayne Street, Suite 800, Fort Wayne, Indiana 46802, all of BAKER & DANIELS, 111 East Wayne Street, Suite 800, Fort Wayne, IN 46802

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